

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/32250

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : B66B 5/12, 7/04, 5/18  
 US CL : 187/370, 366, 375, 379

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 U.S. : 187/370, 366, 375, 379

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
 NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 USPTO APS EAST

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,224,570 A (FROMBERG) 06 July 1993 (06.07.1993), figures 1-2.	1-20
A	US 5,377,786 A (NAKAGAWA) 03 January 1995 (03.01.1995), see entire document.	1-20
A	US 6,092,630 A (WENDEL et al) 25 July 2000 (25.07.2000), figure 5.	7, 10, 14
A	US 6,176,350 B1 (SCHLOSSER) 23 January 2001 (23.01.2001), see entire document.	1-20

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance  
 "E" earlier application or patent published on or after the international filing date  
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 "O" document referring to an oral disclosure, use, exhibition or other means  
 "P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;"

document member of the same patent family

Date of the actual completion of the international search

25 November 2002 (25.11.2002)

Date of mailing of the international search report

28 MAR 2003

Name and mailing address of the ISA/US

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